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0012/0020

Application Serial No. 10/581,874
Reply to office action of March 3, 2009

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REMARKS/ARGUMENTS

Reconsideration is respectfully requested.

Claims 1-31 are pending before this amendment. By the present amendment, claims 1, 9, 12, 16, 19, 22, 25, 27, 28, and 30 are amended. No new matter has been added.

In the office action (page 2), claims 28-31 stand rejected under 35 U.S.C. §101 because the claimed invention is directed to a non-statutory subject matter. In response, claims 28 and 30 have been amended as a conventional "Beauregard" claim directed to computer-readable storage media. As such, claims 28 and 30 are statutory under 35 U.S.C. § 101. A method claim that is converted to a "Beauregard" claim is no longer considered to be a process claim for the purposes of examination, but rather a product claim. As such, a "Beauregard" claim is not subject to the non-statutory tests set forth in *In re Bilski*. In *Ex parte Bo Li*, the Board stated,

"It has been the practice for a number of years that a "Beauregard Claim" of this nature be considered statutory at the USPTO as a product claim. (MPEP 2105.01, I.)."

Accordingly, since claims 28 and 30 are now directed to a computer-readable storage media, i.e., a "Beauregard" claim, the applicants respectfully submit that claims 28 and 30 are allowable at least since they are considered a product claim for the purposes of examination and is therefore directed to statutory subject matter under 35 U.S.C. § 101.

As requested by the examiner for "excluding the intangible transitory media such as signals, carrier waves etc." (OA page 3), since claims 28 and 30 are now directed to

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a computer-readable storage media, this inherently excludes the carrier waves or transmission medium from storing programs. As a result, the applicant respectfully requests withdrawal of the 35 U.S.C. §101 rejection for claims 28-31.

In the office action (page 4), claims 1-18 stand rejected under 35 U.S.C. §101 because the claimed invention is directed to a non-statutory subject matter.

In response, the applicants have amended claim 1 to read as follows, *inter alia*:

--an image segmentation unit for receiving and segmenting an a panoramic image into a plurality of sub-images--

and

--a bitstream combining unit for combining the sub-image bitstreams and the BMAP information to produce a bit stream--.

The examiner asserts (pages 4-6) that the originally filed claim 1 does not require a transformation of an article “to a different state or thing” and that the “process” is not tied to a particular “machine.” However, as amended, claim 1 is now directed to a process that transforms an article in compliance with the transformation test set forth in *In re Bilski*, — F.3d —, 88 U.S.P.Q.2d 1385 (2008). In accordance with *Bilski*, the received –panoramic image– in claim 1 of the present invention represents physical data external to the claimed process and is correspondingly “transformed” into another state, i.e., –a bit stream–, via the method of claim 1. In *Ex parte Bo Li*, Appeal 2008-1213 (BPAI 2008), the Board states that under *Bilski*, the steps must call for a “transformation of an article to a different state or thing” or a “transformation of data or signals.” Therefore, under *Bilski* and *Bo Li*, amended claim 1 is directed to statutory subject matter under 35 U.S.C. § 101 since the claimed method changes a –panoramic

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image— into a —a bit stream— according to the present invention. That is, a transformation of a —panoramic image— from an image segmentation unit into a plurality of sub-images of the original panoramic image, which is then encoded through a first encoding unit and BMAP construction unit, wherein a bitstream combing unit combines the sub-images bitstreams and BMAP information to —a bit stream— occurs. Accordingly, the applicants respectfully request withdrawal of the 35 U.S.C. § 101 rejection since amended claim 1 is now directed to statutory subject matter (specification [40]-[48] and [90]-[95] and FIGs. 4, 5, 11, and 12).

Further, in response, the applicants have amended claim 1 to read as follows, *inter alia*:

—a processor and a memory, the memory having stored thereon:—.

Accordingly, since independent claim 1 has been amended to include a —processor— and a —memory—, which can be clearly understood as being physical hardware devices, the applicants additionally respectfully submit that the rejection under 35 USC 101 is further overcome and should therefore be withdrawn for this additional reason.

Independent claims 9, 12, and 16 have been amended to include similar limitations of claim 1. Therefore, for reasons analogous to those argued above with respect to claim 1, claims 9, 12, and 16 are also directed to statutory subject matter under 35 U.S.C. § 101 for reason mentioned above for claim 1.

Therefore, the applicants earnestly solicit an indication of allowable subject matter with respect to claims 1-18 for at least the reasons set forth above.

In the office action (page 6), claims 19-27 stand rejected under 35 U.S.C. §101

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as not falling within one of the four statutory categories of invention.

In response, the applicants have also amended independent claims 19, 22, 25, and 27 similarly to the amendments for claims 1, 9, 12, and 16, wherein claims 19, 22, 25, and 27 are the respective method claims for the amended apparatus claims 1, 9, 12, and 16 described above that we believe are now directed to statutory subject matter under 35 U.S.C. § 101. Therefore, for similar reasons analogous to those argued above with respect to claims 1, 9, 12, and 16, the applicants also earnestly solicit an indication of allowable subject matter with respect to claims 19-27 based on similar reasons mentioned above of claim 1 for overcoming the 35 U.S.C. § 101 rejection for claim 1.

In the office action (page 7), claims 1, 7-9, 12-19 and 22-31 stand rejected under 35 U.S.C. §102(b) as being anticipated U.S. Patent No. 5,581,361 (You). The "et al." suffix is omitted in a reference name.

The present invention relates to a system and method for encoding and decoding **panoramic images** using a bitstream map by random access (i.e.; allows a user to directly access a desired frame or region in a image sequence from the panoramic image (PCT/KR2004/002917 herein after "specification" [1] and [10]). The panoramic images are generated from a panoramic video, which requires **multiple capturing** of scenes by providing wider angles of a scene by **combining multiple panoramic Images of adjacent scenes** (specification [3]). FIG. 1 of the present invention illustrates a method of obtaining three-dimensional video, where panoramic images are obtained from multiple cameras using parallel or divergent views, which are combined to generate panoramic image data used in the claimed invention that You fails to teach or

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suggest.

Further, FIG. 4 of the present invention illustrates an example of reproduction of a local area of a panoramic image by random accessing without having to first decode the whole panoramic image before displaying a part of the whole panoramic image, which reduces system resources. Accordingly, the present invention encodes and decodes a panoramic image such that when the panoramic image is displayed on a smaller display screen, the whole image does not have to be decoded first (i.e.; stored in the memory of devices and thereafter the requested region data is finally sent to display) (specification [14]-[17]).

Claim 1 has been amended to clarify the present invention. Claim 1 recites, inter alia:

**—a processor and a memory, the memory having stored thereon:
an image segmentation unit for receiving and segmenting an a
panoramic image into a plurality of sub-images—**

and

**—a bitstream combining unit for combining the sub-image bitstreams and
the BMAP information to produce a bit stream—.**

Support for the features added to claim 1 can be found at least in the specification at paragraphs [40]-[48] and [90]-[95] and FIGs. 4, 5, 11, and 12.

The applicants respectfully submit that nowhere in You teaches or discloses these limitations of amended claim 1, because You only relates to digital VCR (You page 3, lines 10-14). Thus, the applicants respectfully state that You is unrelated to the claimed invention of **receiving and segmenting panoramic images** into a plurality of sub-images, wherein the sub-images (i.e.; sections of the whole panoramic image as

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shown in FIG. 4 of the present invention) are randomly accessed by a user at high speeds while minimizing a decrease in compression efficiency in compression of the received and segmented panoramic image (specification [17]), because the whole panoramic image is not required to be saved prior to accessing the section of the whole panoramic image.

Accordingly, nowhere in You teaches or discloses the limitation of amended claim 2 that recites, inter alia: —a processor and a memory, the memory having stored thereon: an image segmentation unit for receiving and segmenting a panoramic image into a plurality of sub-images— and —a bitstream combining unit for combining the sub-image bitstreams and the BMAP information to produce a bit stream—.

In contradistinction, FIGs. 5 and 6 of the present invention discloses:

"the image compression system includes an image segmentation unit 110, an encoding unit 120, a BMAP constructing unit 130, a binarization unit 140, and a bitstream combining unit 150. The image segmentation unit 110 segments an input panoramic image into a plurality of tile images using tile construction information. Here, the tile images represent sub images included in the whole image, and the tile construction information includes information on a segmentation form. In the case that each tile image has the same size, for instance, horizontal and vertical pixel values of each tile image become the tile construction information. FIG. 6 shows a panoramic image segmented into eight of tile images by the image segmentation unit 110.

The encoding unit 120 compresses each of the tile images segmented by the image segmentation unit 110 to encode the tile images. According to an embodiment of the present invention, the encoding unit 120 can compress the images using JPEG coding.

In this case, the encoding unit 120 includes a DCT (discrete cosine transform) unit 121 for discrete-cosine-transforming the tile images, a quantization unit 122 for quantizing the output signal of the DCT unit 121, and an entropy encoder 123. The internal configuration and operation of the encoding unit 120 are well known in the art so that detailed explanation therefor is omitted.

The BMAP construction unit 130 receives bitstreams of the tile images output from the encoding unit 120, calculates the quantity of information generated for each tile image and **combines the quantity of**

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generated information and the tile construction information to generate BMAP (bitstream map) information. BMAP information according to an embodiment of the present invention is as follows. The BMAP information includes header information, tile construction information and the quantity of bits generated for each tile image.

Table 1

Header information	Tile construction information	Quantity of bits generated for tile 1	Quantity of bits generated for tile N

The header of the BMAP information can include a synchronization bit, a start signal, a version number and so on. The header can include a variety of information items, as necessary.

The binarization unit 140 binarizes the BMAP information outputted from the BMAP construction unit 130. The bitstream combining unit 150 combines the bitstreams of the tile images outputted from the encoding unit 120 and the bitstream of the BMAP information outputted from the binarization unit 140 to form a final bitstream as follows.

Table 2

Header information	BMAP	Tile 1 encoded bitstream	Tile N encoded bitstream

The header of the final bitstream can include various information items such as titles and color information on images. The bitstream of the BMAP information is placed prior to the tile image bitstream in the final bitstream according to the embodiment, but the position of the BMAP information can be changed.

A decoding system receives the bitstream and reads the BMAP information from the received bitstream such that the position of a tile image including a desired region can be easily recognized.

Accordingly, **an image only in the desired region can be decoded and provided to the user.** Consequently, the present invention can rapidly provide a user-desired image with a small quantity of calculations whereas the conventional method that decodes the whole panoramic image, stores the decoded image and then provides an image in a desired region to the user.

A bitstream obtained by encoding a tile image is called "a tile image bitstream," and a bitstream obtained by combining the tile image bitstream with the BMAP information and then actually transmitted is called "a whole image bitstream," hereinafter."

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(specification [41]-[51] [emphasis added] and FIGs. 5, 6, 11, and 12).

Accordingly, the applicants respectfully submit that nowhere in You teaches or discloses amended claim 1 of the presently claimed invention recited above. Therefore, the applicants respectfully submit that claim 1 is in condition for allowance over You.

In regard to amended independent claims 9, 12, 16, 22, 25, 27, 28, and 30, these claims recites similar features to those argued above in claim 1. Therefore, for reasons analogous to those argued above with respect to claim 1, the applicants respectfully submit that claims 9, 12, 16, 22, 25, 27, 28, and 30 are in condition for allowance over the You reference.

In regard to claims 2-8, 10-11, 13-15, 17-21, 23-24, 26, 29, and 31, the applicants respectfully submit that these claims are allowable at least since they depend from either claim 1, 9, 12, 16, 22, 25, 27, 28, and 30, which are now considered to be in condition for allowance for the reasons mentioned above for claim 1.

For the reasons set forth above, the applicants respectfully submit that claims 1-31, now pending in this application, are in condition for allowance over the cited references. Accordingly, the applicants respectfully request reconsideration and withdrawal of the outstanding rejections and earnestly solicit an indication of allowable subject matter.

This amendment is considered to be responsive to all points raised in the office action.

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Should the examiner have any remaining questions or concerns, the examiner is encouraged to contact the undersigned attorney by telephone to expeditiously resolve such concerns.

Respectfully submitted,

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